

**PRODUCTION OF OPTICALLY ACTIVE ALCOHOL BY REDUCTION WITH
ASYMMETRIC BORANE**

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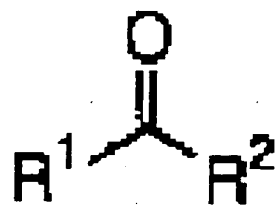
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Abstract

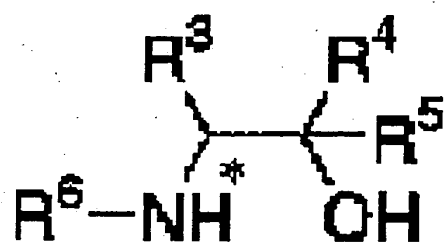
PROBLEM TO BE SOLVED: To obtain an optically active alcohol which is useful as a medicine, agrochemical or the like in high asymmetric yield by asymmetric reduction of an unsymmetrical ketone with hydroborane in the presence of a chiral β -aminoalcohol and a trialkoxyborane.

SOLUTION: (A) A compound formula I ($R<1>$ and $R<2>$ are each an organic residue different from each other) is reduced with (D) hydroborane in the presence of (B) a chiral β -aminoalcohol of formula II [$R<3>$ is an alkyl, a cycloalkyl, a (substituted) aryl; $R<4>$ and $R<5>$ are each H, an alkyl; $R<6>$ is H, an alkyl, a cycloalkyl; * is an asymmetric carbon] and (C) a compound of formula III ($R<7>$ is an alkyl) to give an optically active alcohol of formula IV ($R<1>$ and $R<2>$ are each an organic residue same as $R<1>$ and $R<2>$ respectively). The component A is preferably, for example, acetophenone, propiophenone, phenacyl chloride, benzyl phenyl ketone. An α -oxoketoxime derivative also may be used as a component A.

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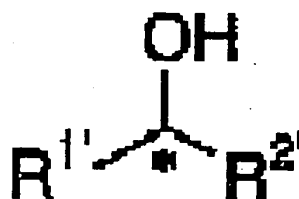
I



II



III



IV